FORCED MERGER AND EFFICIENCY IN MALAYSIAN BANKING

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ABSTRACT

This paper examine whether the so-called forced consolidation of the banking industry in Malaysia have increase the competitiveness of the Malaysian banks by analyzing the impact of mergers on bank efficiency. To achieve the objective, the study analyzed the performance of banks before and after the merger by estimating both cost and profit efficiency scores. The results show that only two out of the ten banks show significant improvement in the efficiency level after the merger. The results also indicate no significance difference in the efficiency level between the anchor banks and the target banks. The results suggest that the selection of anchor banks in the force merger process undertaken by the government is not necessarily based on efficiency. As such, the force merger process fails to achieve its desired objective. Hence, for the merger process to be fruitful in terms of achieving its objective to make the merged banks stronger and more efficient, the selection of anchor banks should be properly scrutinized in future merger exercises.

Key Words: force merger, cost efficiency, profit efficiency, stochastic frontier, Malaysian banks

INTRODUCTION

Malaysia has introduced several important institutional and policy changes (e.g. banking mergers) in recent years in order to strengthen the Malaysian banking industry. With 71 banking institutions prevailing in the country as at June 1999, there are 2,712 branches located all over the nation as a whole (Bank Negara Malaysia, 1999). In July 1999, the government announced plan to forced local banks to merge into six larger outfits. In addition to the 21 domestic commercial banks, 25 finance companies and 12 merchant banks will also be merged into six financial institutions. The government believed that the consolidation of the banking industry with the creation of six domestic financial groups would ensure that the domestic banking institutions would be able to withstand pressures and challenges arising from globalization and from an increasingly competitive global environment.

As of August 1999, 12 finance companies have been absorbed by their parent commercial banks whilst 2 finance companies have been merged with their identified anchor finance companies. This move towards consolidation through merger is indeed a common practice globally to achieve economies of scale and higher productivity. The need to merge is even more imperative in the face of increasing pressure under World Trade Organization (WTO) for countries to open up their financial markets to further entry of foreign banks.

The most common justification for bank mergers is they should result in cost reduction and superior operating efficiency. There exist several theoretical reasons why bank mergers in particular might improve productivity and efficiency. First, merger reduces non-price competition, which has resulted in wasteful duplication of resources that leads to higher costs. Second, an increase customer base could lead to higher utilization rates, increased marginal productivity of labor, and enhanced revenues. Third, mergers decreased administrative costs by consolidating services. If these arguments are true, we expect that merging banks will exhibit improved productivity, technical efficiency and scale efficiency,

thereby lowering costs, ceteris paribus. However, the above argument applies to those mergers which are voluntarily in nature. The questions arise whether the advantage of this voluntary merger also applies to direct or forced merger like what Malaysian banks experienced. Hence, this paper presents an interesting case on the effects of merger on bank efficiency where the merger was forced or directed.

Secondly, the selection of banks in the forced merger was argued to be base on the characteristic that, according to some industrial observers, would results in competitive gains. Hence, the mergers will benefit the banking industry in particular and other sectors in general. This study will attempt to justify whether consolidation of the banking industry in Malaysia have increase the competitiveness of the Malaysian banks by analyzing the impact of mergers on bank efficiency.

OVERVIEW OF THE FORCED MERGER IN THE MALAYSIAN BANKING INDUSTRY

On July 1999, Bank Negara Malaysia, proposed a major restructuring plan for its 71 domestic financial institutions to be consolidated into sixth. In theory, the merger plan was fundamentally desirable because the banking sector had too many banks for a small economy, and several banks repeatedly suffered from severe non-performing loans, which in part may have arisen from inefficiency. Another reason was the increasing pressure from World Trade Organization (WTO) to open up local financial markets to foreign banks (Bank Negara Malaysia, 1999).

Table 1 show the consolidation plan proposed by the government in 2000, whereby, it was decided that the final ten acquirers were approved by the central bank, Bank Negara Malaysia (BNM), with their respective targets and subsidiaries. The BNM proposed ten banks that act as anchor with the involvement of eleven subsidiaries financial institution and 35 financial institutions as targets. AmBank and Alliance Bank Malaysia were previously the Arab-Malaysian Bank and Multi-Purpose Bank, respectively. Bumiputra-Commerce Bank (BCB) was created from the merger between Bank of Commerce and Bank Bumiputra (BBMB), the second largest banking institutions prior to the 1997 crisis.

Greater size may enable large banks to operate more efficiently and more profitably than their smaller rivals and to exert a unique influence on market competition. A major consequence of the M&A is a decrease in the number of banks but at the same time, a rise in the number of large banks.

TABLE 1: Final 10 Acquirers Approved by Bank Negara Malaysia and their Respective Targets and Subsidiaries on 2000

Anchor Bank	Banking Institutions in the Group	
	Subsidiaries	Targets
Alliance		Sabah Bank, International Bank Malaysia Berhad, Bolton Finance, Sabah Finance, Bumiputra Merchant Bankers, Amanah Merchant Bankers
Ambank	Arab Malaysian Finance Berhad	MBF Finance Berhad
Bumiputra Commerce	Commerce Finance Berhad	Commerce International Merchant Bankers, bank Bumiputra
EON Bank	EON Finance Berhad	Oriental Bank, City Finance, Perkasa Finance, Malaysia International Merchant Bankers
Hong Leong Bank	Hong Leong Finance Berhad	Wah Tat Bank, Credit Corporation Malaysia
Malayan Banking Group	Mayban Finance Berhad	PhileoAlied Bank, Pacific Bank, Sime Finance, Kewangan Bersatu, Aseambanker Malaysia
Perwira Affin Bank	Affin Finance Berhad, Perwira Affin Merchant Bankers	BSN Commercial Bank, BSN Finance, Asia Commercial Finance, BSN Merchant Bank
Public Bank	Public Finance Berhad	Hock Hua Bank, Advance Finance, Sime

		Merchant Bankers
RHB Bank	RHB Sakura Merchant Bankers Berhad	Sime Bank, Bank Utama, Delta Finance, Interfinance Berhad
Southern Bank		Ban Hin Lee Bank, Cempaka Finance, Perdana Finance, United Merchant Finance, Perdana Merchant Bank

Source: Bank Negara Annual Report 2001.

At the end of 2006, the Malaysian banking industry consists of a total of ten banks with at least RM100 billion in domestic banking assets, including four banks with assets more than RM10 billion (see Table 2).

TABLE 2: Total assets of 10 domestic Financial Institutions , 1997-2006
(RM '000)

	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
BCB	23781070	24417040	68034800	69881710	74370320	91185740	97574050	11164 9300	11316 6500	15917 4200
HLB	20517260	22602960	24539380	29288500	39543600	42942400	43436530	48917740	57508450	60422940
AFB	23274610	21767700	24499070	24656350	31305200	33068080	35046180	32612530	31032290	35396560
EON	17962 62	19031 06	16862 26	15905 20	15170 98	30572 780	31508 750	33174 610	35472 190	39125 460
ALB	16312 52	14458 22	86425 1	11659 82	17220 430	19064 450	20204 160	23296 960	23610 100	23463 200
SBB	92034 76	90751 28	17599 580	23446 400	24688 190	26076 300	29689 010	31362 300	32576 000	33642 012
RHB	48733780	48475950	60241280	56823660	58511740	58297860	70140880	82568990	90080110	10336 8800
MYB	11043 8200	11451 4200	11747 8500	12732 2400	14089 7300	14966 3900	15984 4500	17824 5800	19093 1300	22302 7700
AMB	13428879	13978781	13733216	14901418	15295586	13461855	16164768	15047167	15879658	15895745
PBB	41903220	41948290	43237600	44234560	53242320	61765680	64405790	91803840	11125 8500	14745 2800

Source: Annual Report from various domestic financial institutuions, 1996-2005.

LITERATURE REVIEW

A large number of studies attempt to resolve the question whether mergers have a beneficial impact on performance of banks by examining the long-term profitability, cost efficiencies and marker performance of merger survivors. Overall, evidences on the benefit of mergers are mixed.

The study of bank merger and efficiency in the US banking industry has been conducted by Akhavein, Berger, and Humphrey (1997). By using the distributional-free approach, they examine the profit function of the US commercial banks with total assets of more than US$100 million for the period 1981 to 1989. The results suggest that bank mergers resulted in cost reduction and profit efficiency. These results are consistent with Vander Vennet (1996) who examined the cost function of 192 European Union credit institution mergers from year 1988 to 1992 using the stochastic function approach. He found significant improvement in the cost efficiency as a result of bank mergers. Athanasoglou and Brissimis (2004) investigate the effect of M&As in the Greek banking system in terms of cost and profit efficiency. They found that the bank mergers resulted in a significant improvement in cost and profit

Lin (2002) estimates cost efficiency of 43 commercial bank mergers in Taiwan from 1997 to 1999 using the stochastic frontier analysis. He found that the merger banks exhibit higher cost efficiency as compared to the non-merger banks. Negative correlation between cost inefficiency index and bank merger confirmed that the merger resulted in improvement in cost efficiency. Karim (2001) argued in support of banking mergers currently undertaken in the Malaysian banking industry. His support for merger is based on the finding that banking efficiency increases as bank size increases. However, his study does not compare the differences in bank efficiency between pre- and post-merger period. Rhoades (1998) summarizes nine cases study, by nine authors, on the efficiency effects of bank mergers. All nine of the mergers resulted in significant cost cutting in line with premerger projections. Four of the nine mergers were clearly successful in improving cost efficiency but five were not.

Ya-Hui Peng and Kehluh Wang (2004) studied the cost efficiency, economies of scale and scope of the Taiwanese banking industry, specifically focusing on how bank mergers affect cost efficiency. The results suggest that bank merger activity is positively related to cost efficiency. In addition, mergers can enhance cost efficiency, even though the number of bank employees does not decline. Resti (1998) studied the wave of mergers that has taken place in the Italian banking system. The results indicate that merged banks seem to have increased their efficiency in the years after the merger. Hence, his results find that mergers between two equally-sized banks generated better efficiency gains. Rhoades (1998) using US banks data found modest gain cost X-efficiency due to merger.

On the other hand, there are quite a number of studies that shows negative or insignificant effect of merger on efficiency. Fixler and Zieschang (1993) find that acquiring banks achieve no gains in efficiency. This result is supported by Rezitis (2008) who studied the impact of M&As on the technical efficiency and total factor productivity of the Greek banking sector from 1993 to 2004 using the stochastic output distance function. He found that bank mergers resulted in negative technical efficiency and total productivity growth. The technical efficiency was found to decrease in the post merger period for the merger banks, while the non-mergers banks experienced an increased in technical efficiency. Rhoades (1993) studied whether banks involved in horizontal mergers achieve efficiency improvements relative to other banks. The results of the study indicate that horizontal bank mergers did not have a significant effect on efficiency relative to other banks. The results also show that the acquiring banks, on average, are more efficient than the target banks.

Other studies found very little improvement in average cost X-efficiency for mergers of either large or small banks (Berger, 1998; Calomiris and Karceski, 1998). The results suggest that the cost efficiency effects of an M&A may depend on the type of M&A, the motivations behind it, and the manner in which the management implemented its plans. DeYoung (1997), estimated the pre- and post-merger X-inefficiency mergers in the US. He found that, efficiency improved in only a small majority of mergers. Peristiani (1997) investigates the post-merger performance of acquiring banks that participated in a merger during the period 1980-90 in US. He fined that acquirers failed to improve X-efficiency after the merger. His results suggested that improvements in post-merger performance depend on the ability of the bank to strengthen asset quality.

Based from the literatures reviewed, we can make several conclusions. First, a large number of studies attempt to resolve the question whether mergers have a beneficial impact on performance of banks by examining the long-term profitability, cost efficiency and market performance of merger survivors. However, overall, evidences on the benefit of mergers are mixed. Second, the effect of M&As on efficiency and productivity depends on the type of M&As, the motivation behind it, and the means in which the management implemented its plans. Third, there is no study on the effect of merger on efficiency and profitability in the case where the mergers are being forced by the government/regulators. Hence, this study provides a unique case for the issue merger and efficiency.

METHODOLOGY AND DATA

We will compare the performance of banks before and after mergers and also between the acquirer and the acquired banks. For these purpose, we introduce cost and profit efficiency scores as a measure of firm's performance.

Cost efficiency estimation

Our first measure of bank performance is the cost efficiency. To get the cost efficiency scores, we estimate the following stochastic cost frontier translog function.

$$\ln C_{it} = \beta_0 + \sum_{j=1}^{n} \beta_j \ln y_{it} + \sum_{k=1}^{m} \beta_k \ln w_{kit} + \frac{1}{2}\sum_{j}^{n}\sum_{l}^{m} \beta_{jl} \ln y_j y_l + \frac{1}{2}\sum_{k}^{m}\sum_{p}^{m} \beta_{kp} \ln w_{kit} \ln w_{pit} + \frac{1}{2}\sum_{j}^{n}\sum_{k}^{m} \beta_{jk} \ln y_{jit} \ln w_{kit} + \beta_q t + u_{it} + v_{it} \quad (2)$$

where ln C_{it} is the natural logarithm of the total cost; ln y_{it} = the natural logarithm of the jth output (j = 1,2,…,n); ln w_{kit} is the natural logarithm of the kth input price (k = 1,2,…,m). ; t is the year of observation; and β*'s* are the coefficients to be estimated. The v_{it}*s* are random variables associated with measurement errors in the input variable or the effect of unspecified explanatory variables in the model and the u_{it}s are non-negative random variables, associated with inefficiency of input used. In this study, the banks total cost will include sum expenses on wages and salaries, land, buildings, and equipment and interest on deposits, while the outputs are dollar amounts of commercial and industrial loans, dollar amounts of other loans, dollar amounts of time deposits, dollar amounts of demand deposits, and dollar amounts of securities and investments. The input price will include expenses on wages and salaries per employee (unit price of labor), expenses on land, buildings, and equipment per dollar of assets (unit price of physical capital), and expenses on interest per dollar of deposits (unit price of financial capital). The cost efficiency of input used for the *i*-th bank in the *t*-th year of observation, given the values of the outputs and inputs, is defined as the ratio of the stochastic frontier input use to the observed input used. The stochastic frontier input use is defined by the value of input use if the cost inefficiency effect, u_{it}, is zero (i.e., the bank is fully efficient in the use of input). If a translog stochastic frontier cost function is used, the cost efficiency for firm *i* at time *t* is defined by equation (3),

$$\begin{aligned} CE_{it} &= \frac{C_{it}(y_{it}, w_{it}; \beta)\exp(v_{it})}{C_{it}(y_{it}, w_{it}; \beta)\exp(v_{it} + u_{it})} \\ &= \exp(-u_{it}) \\ &= \exp(-z_{it}\delta - \eta_{it}). \end{aligned} \quad (3)$$

where $CE_{it} \leq 1$. The reciprocal of this value, exp. (u_{it}), is no less than one can be interpreted as measure of the cost inefficiency of input use.

Profit Efficiency Estimation

A second type of our efficiency analysis focuses on the alleged superiority of merged banks in terms of profit efficiency. Merger may increase the revenue-generating capacity of merged banks. We investigate this issue by estimating a profit function. As in the parametric cost function approach, a bank is labeled inefficient if its profits are lower than the best practice banks after removing random error. In other words, profit efficiency measures how close a bank comes to generating the maximum achievable profit given input prices and outputs. We follow Berger and Mester (1997) and Vander Vannet (2002) in using the concept of alternative profit efficiency which relates to input prices and output quantities instead of output prices. This output is held constant while output prices vary and may affect profit. We choose this specification in the modeling because output prices cannot be measured accurately and also it can reduce the scale bias that might be present when output levels are allowed to vary. Hence, we estimate the following stochastic profit frontier translog function.

$$\ln PROF_{it} = \beta_0 + \sum_{j=1}^{n} \beta_j \ln y_{it} + \sum_{k=1}^{m} \beta_k \ln w_{kit} + \frac{1}{2}\sum_{j}^{n}\sum_{l}^{m} \beta_{jl} \ln y_j y_l$$

$$+\frac{1}{2}\sum_{k}^{m}\sum_{p}^{m}\beta_{kp}\ln w_{kit}\ln w_{pit}+\frac{1}{2}\sum_{j}^{n}\sum_{k}^{m}\beta_{jk}\ln y_{jit}\ln w_{kit}$$

$$+\beta_q t+u_{it}+v_{it} \qquad (4)$$

Data

The data for estimating the cost frontier function for the Malaysian Banks in our sample are drawn from the Bank's Annual Report. The period of the study spans from 1995 to 2005.

RESULTS AND DISCUSSIONS

The results of the maximum likelihood estimation for cost efficiency equation using the standard translog model are presented in Table 3. The results show that all input prices and outputs of the commercial bank seem to have large influence on the banks' cost.

The average estimated cost efficiency score for the banks in the sample is 0.733. The results indicate that Malaysian banks have achieved a mean overall efficiency level of 73.3 % suggesting input waste of 26.7 %. This is quite consistent with results from other studies. Similar studies performed on Italian banks by Resti (1997) found that mean efficiencies of about 70% under both the DEA and econometric models. Pastor et al. (1997) has reported efficiency score of 80% in their study of banks in the U.S. and seven Western European countries while Lang and Welzel (1996) has found average efficiency scores of 54% and 61% for German banks. However, study by Chu and Lim (1998) on Singaporean banks, which operates in a similar oligopolistic banking environment reported an average efficiency levels of 95.3%, hence suggesting inefficiencies of 4.7% during the period of 1992-1996 lower compared to our findings of 26.7%.

TABLE 3: Maximum-Likelihood Estimates of the Translog Stochastic Frontier Cost Function

Variable	coefficient	std.error	p-value
lnY1	1.7486	0.1662	0.0000
lnY2	-0.9902	0.0646	0.0000
lnY3	1.0694	0.1568	0.0000
ln(1+W1)	225.1826	16.7535	0.0000
ln(1+W2)	1.7451	0.1800	0.0000
ln(1+W3)	26.6764	1.0124	0.0000
lnY1*lnY2	0.2048	0.0417	0.0000
lnY1*lnY3	-0.2559	0.0154	0.0000
lnY2*lnY3	0.0052	0.0467	0.9118
ln(1+W1)*ln(1+W2)	-205.6568	29.2311	0.0000
ln(1+W1)*ln(1+W3)	4,094,504,912,000.0000	1,518,500,200.0000	0.0000
ln(1+W2)*ln(1+W3)	-4,094,504,912,000.0000	1,518,500,200.0000	-6.1284
lnY1*ln(1+W1)	-24.8604	15.5413	0.1097
lnY1*ln(1+W2)	-0.7454	0.3579	0.0373
lnY1*ln(1+W3)	-12.3898	1.3288	0.0000
lnY2*ln(1+W1)	57.3322	5.4381	0.0000
lnY2*ln(1+W2)	-0.3145	0.1126	0.0052
lnY2*ln(1+W3)	4.9151	0.7813	0.0000
lnY3*ln(1+W1)	-33.2679	17.4776	0.0570
lnY3*ln(1+W2)	0.6482	0.3405	0.0569

lnY3*ln(1+W3)	5.5676	1.1189	0.0000
Variance parameters for compound error			
Mu/SgmaU	-0.2776	1.5800	0.8605
Lambda	2.6870	1.1259	0.0170
Sigma	0.2670	0.0948	0.0049
Chi-squared	182.96		
Sig. level	0.0000		

From the estimated cost efficiency scores obtained, the average cost efficiency scores are computed for the anchor banks to compare the cost efficiency level of the banks prior and after the merger. The results are presented in Table 4. The results show that, for Public Bank, the mean efficiency increases from 67.2% for periods prior the merger to 73.4% for periods after the merger. Similarly, for BCB, the mean efficiency increases from 68.2% prior the merger to 77.3% after the merger. For EON Bank, the mean efficiency slightly increase from 62.1% prior the merger to 63.9% after the merger. For RHB Bank, the mean efficiency increases from 65.1% prior the merger to 74.7% after the merger. For Hong Leong Bank, the mean efficiency increases from 73.2% prior the merger to 84.2% after the merger. For Maybank, the mean efficiency increases from 73.6% prior the merger to 91.5% after the merger. For Southern Bank, the mean efficiency increases from 68.2% prior the merger to 77.3% after the merger.

However, for Affin Bank, the mean efficiency decreases from 78.7% prior the merger to 69.0% after the merger. Similarly, for Ambank and Alliance Bank, the mean efficiency decreases from 70.8% and 83.5% prior the merger to 55.4 and 67.7% after the merger, respectively.

Based on the results, most of the commercial banks in Malaysia experienced an increase in cost efficiency level after the merger process except for Affin Bank, Ambank and Alliance Bank. However, the results of the mean difference tests shows that only two banks, namely Hong Leong Bank and Maybank, experienced significant improvement in cost efficiency level after the merger exercise. This is statistically significant at 5% and 1% significance level for variance difference test and mean difference test, respectively.

Table 5 compare the mean cost efficiency level between the anchor banks (acquiring banks) and non-anchor banks' (acquired banks). The results show that, in some cases, the anchor banks have higher mean cost efficiency level than the non-anchor banks. In the case of BCB Bank, the anchor bank (77.3%) has higher mean cost efficiency than the non-anchor bank, BBMB Bank (68.5%). Likewise, for EON Bank, the anchor bank (62.0%) has higher mean cost efficiency than the non-anchor bank, Oriental Bank (61.5%). For Affin Bank, the anchor bank (78.7%) has higher mean cost efficiency than the non-anchor bank, BSN Bank (66.4%). For Maybank, the anchor bank (73.6%) has higher mean cost efficiency than both the non-anchor bank, Pacific Bank (72.6%) and Phileo Allied Bank (70.6%).

On the other hand, there are many cases where the anchor banks have lower mean cost efficiency than the non-anchor banks. The results show that in the case of Public Bank (67.2%), the mean cost efficiency is lower than its non-anchor bank, Hock Hua Bank (71.6%). Similarly, in the case of Public Bank (67.2%), the mean cost efficiency is lower than its non-anchor bank, Hock Hua Bank (71.6%). In the case of Hong Leong Bank (73.2%), the mean cost efficiency is lower than its non-anchor bank, Wah Tat Bank (97.4%). In the case of Ambank (74.5%), the mean cost efficiency is lower than its non-anchor bank, bank Utama Bank (75.6%). In the case of Southern Bank (66.7%), the mean cost efficiency is lower than its non-anchor bank, BHL Bank (71.2%). In the case of Alliance Bank (81.8%), the mean cost efficiency is lower than both of its non-anchor bank, International Bank (96.7%) and Sabah Bank (88.6%).

TABLE 4: Cost Efficiency before and after merger

Bank	Pre-merger		Post-merger		F-stat	t-stat
	Variance	Mean	Variance	Mean		
Public Bank	0.0182	0.6718	0.0472	0.7336	0.3857	-0.5786
BCB	0.0621	0.6820	0.0030	0.7733	0.8445	-0.9306
EON Bank	0.0209	0.6206	0.0045	0.6386	4.6449	-0.2550
RHB	0.0013	0.6509	0.0191	0.7467	0.0662	-1.3418
Affin	0.0190	0.7873	0.0090	0.6899	2.1052	1.3311
Hong Leong	0.0061	0.7319	0.0013	0.8423	4.5708**	-2.8817**
Maybank	0.0031	0.7355	0.0018	0.9149	2.7646**	-5.9295***
Ambank	0.0677	0.7085	0.0856	0.5545	0.7904	0.9250
Southern Bank	0.0028	0.6667	0.0023	0.7326	1.2353	-2.1318
Alliance Bank	0.0047	0.8351	0.0243	0.6770	0.1940	1.8580

The results highlighted that most of the anchor banks selected for the merger process exhibit a lower cost efficiency level than the target banks. Nevertheless, no significance difference is found on the efficiency level between the anchor banks and the target banks except for Hong Leong Bank and Alliance Bank where in both cases, the anchor banks are less efficient than the target banks. Hence, one cannot conclude that efficient banks are chosen to become the anchor banks for the merger exercise. For example, the non anchor banks such as Wah Tat Bank and International Bank, and Sabah Bank are found to exhibit higher cost efficiency level than their anchor banks and this is statistically significant at 1% significance level.

TABLE 5: Cost Efficiency of Anchor banks versus non-anchor banks prior to merger

Anchor bank	Efficiency score	Non-anchor bank	Efficiency score	F-stat	t-stat
Public Bank	0.6718	Hock Hua	0.7155	4.7705	-0.7205
BCB	0.7717	BBMB	0.6855	5.5481	2.9587
EON Bank	0.6206	Oriental Bank	0.6153	1.6864	0.0711
RHB	0.6509	Bank Utama	0.7264	1.3116	-0.1027
Affin	0.7873	BSN	0.6639	0.5041	1.2317
Hong Leong	0.7319	Wah Tat	0.9744	9.9407**	-7.1654***
Maybank	0.7355	Pacific Bank	0.7262	0.5882	0.2291
		Phileo Allied	0.7059	0.0558	0.2743
Ambank	0.7452	Nil			
Southern Bank	0.6667	BHL	0.7124	2.0672	-1.6116
Alliance Bank	0.8176	International Bank	0.9675	11.9935**	-4.4800***
		Sabah Bank	0.8862	4.6365	-1.5345

Profit Efficiency

The results of the maximum likelihood estimation for profit efficiency equation using are presented in Table 6. The results presented show that the output of the commercial banks seems to have large influence on the banks' profit.

TABLE 6: Maximum-Likelihood Estimates of the Translog Stochastic Frontier Profit Function

Variables	coefficient	std.error	p-value
lnY1	-2.1606	0.8404	0.0101
lnY2	1.1301	0.3614	0.0018
lnY3	2.2355	0.6091	0.0002
ln(1+W1)	-382.1931	92.4369	0.0000
ln(1+W2)	-6.2712	1.0375	0.0000
ln(1+W3)	7.7666	6.3508	0.2214
lnY1*lnY2	0.1305	0.2094	0.5333
lnY1*lnY3	0.2063	0.0795	0.0094
lnY2*lnY3	-0.4680	0.2183	0.0321
ln(1+W1)*ln(1+W2)	762.6280	160.3015	0.0000
ln(1+W1)*ln(1+W3)	-14215527940000.0000	6074001000.0000	-6.1284
ln(1+W2)*ln(1+W3)	14215527940000.0000	6074001000.0000	0.0000
lnY1*ln(1+W1)	136.7688	43.1222	0.0015
lnY1*ln(1+W2)	0.7560	0.7621	0.3212
lnY1*ln(1+W3)	13.8615	8.3847	0.0983
lnY2*ln(1+W1)	-80.3871	28.6030	0.0049
lnY2*ln(1+W2)	0.7843	0.4714	0.0962
lnY2*ln(1+W3)	-0.5321	3.7489	0.8871
lnY3*ln(1+W1)	-53.1433	58.3712	0.3626
lnY3*ln(1+W2)	-1.3789	0.7692	0.0730
lnY3*ln(1+W3)	-13.8196	6.4005	0.0308
Variance parameters for compound error			
Mu/SgmaU	0.0000	3.7529	1.0000
Lambda	1.3354	0.7604	0.0790
Sigma	1.1459	0.6249	0.0667
Chi-squared	17.29		
Sig. level	0.0003		

The estimated average profit efficiency score for all banks in the sample is 0.484.The result indicates that Malaysian banks have achieved a mean overall profit efficiency level of 48.4 % suggesting profit waste of 51.6%. This mean profit efficiency score is quite lower than the study by Dacanay (2007) which reported profit efficiency scores of range 88.75% to 90.68% for the Philippine's bank.

Based on the estimated profit efficiency scores obtained, the average profit efficiency scores are computed for the anchor banks in order to provide a comparison of the profit efficiency level of the banks involved in the merger process and the results are presented in Table 7. The results are mixed. For Public Bank, the mean profit efficiency increases from 38.7% prior the merger to 46.1% after the merger. Similarly, for Hong Leong, the mean profit efficiency increases from 48.3% prior the merger to 57.4% after the merger. For Maybank, the mean profit efficiency slightly increases from 48.4% prior the merger to 57.9% after the merger. For Southern Bank, the mean profit efficiency increases from 49.4% prior the merger to 53.7% after the merger.

TABLE 7: Profit Efficiency before and after merger

Bank	Pre-merger		Post-merger		F-stat	t-stat
	Variance	Mean	Variance	Mean		
Public Bank	0.0166	0.3872	0.0124	0.4613	1.3370	-1.0082

BCB	0.0172	0.3580	0.0120	0.2622	1.4389	1.3054
EON Bank	0.0285	0.4754	0.0153	0.3829	1.8648	1.0163
RHB	0.0302	0.3935	0.0062	0.3398	1.8598	0.6223
Affin	0.0432	0.5020	0.0611	0.2768	0.7070	1.6438
Hong Leong	0.0071	0.4834	0.0078	0.5740	0.9104	-1.7325
Maybank	0.0218	0.4840	0.0086	0.5789	1.5440	-1.2408
Ambank	0.0236	0.5130	0.0496	0.4616	0.4764	0.4523
Southern Bank	0.0093	0.4938	0.0025	0.5373	1.7797	-0.9093
Alliance Bank	0.0267	0.4485	0.0008	0.4399	0.8101	0.1308

However, for BCB Bank, the mean profit efficiency decreases from 35.8% prior the merger to 26.2 after the merger. For EON bank, the mean profit efficiency decreases from 47.5% prior the merger to 38.3% after the merger. For RHB bank, the mean profit efficiency decreases from 39.3% prior the merger to 33.9% after the merger. For Affin bank, the mean profit efficiency decreases from 50.2% prior the merger to 27.7% after the merger. For Ambank, the mean profit efficiency decreases from 51.3% prior the merger to 46.2% after the merger. Lastly, Alliance bank also shows a decrease in mean profit efficiency from 44.8% prior the merger to 44.0% after the merger.

Based on the results, most of the commercial banks in Malaysia experienced a decrease in profit efficiency level after the merger process except for Public Bank, Hong Leong Bank, Maybank and Alliance Bank. However, the results of the mean difference tests shows that none of the anchor banks experienced significant difference in profit efficiency level after the merger exercise.

Next, comparison between the anchor banks and non-anchor banks' mean profit efficiency level is done and the results are presented in Table 8. In most of the cases, the anchor banks have lower mean profit efficiency level than the non-anchor banks. In the case of Public Bank, the anchor bank (38.7%) has lower mean profit efficiency than the non-anchor bank, Hock Hua Bank (56.1%). Likewise, for BCB Bank, the anchor bank (35.8%) has lower mean profit efficiency than the non-anchor bank, BBMB Bank (48.5%). For EON Bank, the anchor bank (47.5%) has lower mean profit efficiency than the non-anchor bank, Oriental Bank (61.8%). For Affin Bank, the anchor bank (50.2%) has lower mean profit efficiency than the non-anchor bank, BSN Bank (51.9%). For Hong Leong Bank, the anchor bank (48.3%) has lower mean profit efficiency than the non-anchor bank, Wah Tat Bank (72.1%). For Maybank (48.4%), it has lower mean profit efficiency than its non-anchor bank, Phileo Allied Bank (56.3%) but higher than its other non-anchor bank, Pacific (42.3%). Ambank (52.1%) has lower mean profit efficiency than its non-anchor bank, Bank Utama (61.1%). Lastly, Alliance bank has lower mean profit efficiency than both of its non-anchor bank, International Bank (63.8%) and Sabah Bank (60.4%).

On the other hand, there is only one case where the anchor bank has higher mean efficiency than the non-anchor banks. The results show that in the case of Southern Bank (53.0%), the mean profit efficiency is higher than its non-anchor bank, BHL Bank (40.8%).

To determine whether there are significant difference in profit efficiency between anchor banks and its non-anchor banks, F-test for difference in variance and t-test for difference in mean were done. The results show that there is significant difference in the mean profit efficiency only in the case where the anchor banks are Public Bank and Hong Leong bank.

The results highlighted that most of the anchor banks selected for the merger process exhibit a lower profit efficiency level than the target banks. Nevertheless, no significance difference is found on the efficiency level between the anchor banks and the target banks except for Public Bank and Hong Leong. Hence, one cannot conclude that profit efficient banks are chosen to become the anchor banks for the merger exercise.

TABLE 8: Profit Efficiency of Anchor banks versus non-anchor banks prior to merger

Anchor bank	Efficiency score	Non-anchor bank	Efficiency score	F-stat	t-stat
Public Bank	0.3872	Hock Hua	0.5608	2.4071**	-2.5241**
BCB	0.3580	BBMB	0.4850	1.9082	-1.7640
EON Bank	0.4754	Oriental Bank	0.6184	1.0682	-1.4915
RHB	0.3935	RHB			
Affin	0.5020	BSN	0.5189	0.6521	-0.1214
Hong Leong	0.4834	Wah Tat	0.7212	2.6048**	-4.0892**
Maybank	0.4840	Pacific Bank	0.4233	0.7382	0.5980
		Phileo Allied	0.5634	0.3840	-0.6779
Bank 11: Ambank	0.5215	Bank Utama	0.6108	1.7182	-1.2073
Bank 13: Southern Bank	0.5303	BHL	0.4077	0.1465	1.4198
Bank 21: Alliance Bank	0.4485	International Bank	0.6379	1.1212	-1.6857
		Sabah Bank	0.6038	1.8413	-1.4837

CONCLUSION

This study analyze cost and profit efficiency in the Malaysian banks by looking at the effect of force mergers undertaken in year 2000 on cost and profit efficiency levels. The study also analyze whether the anchor banks selected in the force merger process are more efficient than its non-anchor banks.

From the results of the study, it is apparent that Malaysian banks have achieved a mean overall cost efficiency level of 73.3 % suggesting input waste of 26.7 %. For profit efficiency, the results show that Malaysian banks have achieved a mean overall profit efficiency level of 48.4 % suggesting profit waste of 51.6%.

The results also show that only two banks, namely Hong Leong Bank and Maybank, experienced significant improvement in cost efficiency level after the merger exercise. This indicates that only two out of the ten banks indicate an improvement in cost efficiency level from the merger exercise. For profit efficiency, the results show that none of the banks experienced significant difference in profit efficiency level after the merger exercise. In addition, no significance difference is found on the efficiency level between the anchor banks and the target banks except for Hong Leong Bank and Alliance Bank. For profit efficiency, the results show that most of the anchor banks selected for the merger process exhibit a lower profit efficiency level than the target banks. Nevertheless, no significance difference is found on the efficiency level between the anchor banks and the target banks except for Public Bank and Hong Leong where in both cases the anchor banks are less efficient than the target banks.

The results of the study concur with the argument by Berger (1998) and Calomiris and Karceski (1998) which suggests that the cost and profit efficiency effects of M&As may depends on the type of M&As, the motivation behind it, and the manner in which the management implemented its plans.

Several policy implications can be made from the results of this study. First, from the results of both cost and profit efficiency analysis of bank force mergers, the selection of anchor banks in the force merger process undertaken by the government are not necessarily based on efficiency. We speculate that motivations other than efficiency were driving this force merger. As such, we argue that this is one reason why the force merger process fails to achieve its desired objective. Hence, to increase the merger likelihood of success in achieving its objective to make the merged banks stronger and more efficient,

the selection of anchor banks should be properly scrutinized in future merger exercises. Second, bigger banks do not necessarily more efficient than smaller banks. Hence, anchor banks should not be selected merely based on size. Other factors, particularly efficiency, need to be considered. Evidence from other merger study indicates that acquiring banks are more efficient than target banks. Third, the results suggest that improvement in post-merger performance is not merely due to the size expansion of the merged banks. Improvement also depends on the ability of the merged banks to strengthen asset quality notwithstanding the result from other studies that found that acquiring banks does not always maintain its pre-merger efficiency.

REFERENCES

Akhavein, J.D., Berger, A.N., and Humphrey, D.B. (1997). The effects of megamergers on efficiency and prices: Evidence from a bank profit function. *Review of Industrial Organization,* 12, pp. 95-139.

Athanasoglou, P.P., and Brissimis, S.N. (2004). The effect of mergers and acquisitions on bank efficiency in Greece. *Economic Bulletin*, 22, pp. 7–31.

Bank Negara Malaysia (1999). *Bank Negara Malaysia Annual Report, 1999*, Kuala Lumpur: Bank Negara Malaysia.

Bank Negara Malaysia (2001). Bank *Negara Malaysia Annual Report, 2001*, Kuala Lumpur: Bank Negara Malaysia.

Berger, A. and Mester, L. (1997). "Inside the black box: what determine differences in the efficiency of financial institutions?, *Journal of Banking and Finance*, 21, 895-947.

Calomiris, C.W. and Karceski, J. (1998). *Is the bank merger wave of the 1990's efficient?* Washingto DC: The AEI Press.

Chu, S,F. and Lim, G.H. (1998), "Share Performance and Profit Efficiency of Banks in an Oligopolistic Market: Evidence from Singapore," *Journal of Multinational Financial Management* 8, 155-168.

Dacanay, S.J.O. (2007). Profit and cost efficiency of Philippine commercial banks under periods of liberalization, crisis and consolidation,*The Business Review, Cambridge*, 7(2), 315-322.

DeYoung, R. (1997). Bank mergers, x-efficiency, and the market for corporate control. *Managerial Finance*, 23, pp. 32-47.

Fixler, D. J., and Zieschang, K. D., (1992), *An index number approach to measuring bank efficiency: An application to mergers*, Chacago: The University of Chicago Press.

Karim, M.Z.K. (2001), Comparative Bank Efficiency across Select ASEAN Countries, *ASEAN Economic Bulletin,* 18(3), pp. 289-304.

Lang, G., Welzel, P., (1996), 'Efficiency and Technical Progress in Banking Empirical: Results for a Panel of German Cooperative Banks ', *Journal of Banking and Finance 20, 1003—1023.*

Lin, P.W. (2002). Cost efficiency analysis of commercial bank mergers in Taiwan. *International Journal of Management*, 19 (3), pp. 408-417.

Pastor, J. M., Perez, F. and Quesada, J. (1997) "Efficiency analysis in banking firms: An international comparison", *European Journal of Operational Research*, **98** (2) 395-407.

Peng, H. and Wang, K. (2004). Cost efficiency and the effects of mergers on the Taiwanese banking industry, The Service Industries Journal, 24(4), 21-39.

Peristiani, S. (1997). Do mergers improve the x-efficiency and scale efficiency of US banks?: evidence from the 1980's, Journal of Money, Credit, and Banking, 29(3), 326-337.

Resti, A. (1998). Regulation Can Foster Mergers, Can Mergers Foster Efficiency? The Italian Case. Journal of Economics and Business 50(2), 157-169.

Rezitis, A.N. (2008). Efficiency and productivity effects of bank mergers: Evidence from the Greek banking industry *Economic Modelling*, 25*,* pp. 236-254.

Rhoades, S. (1993), Efficiency effects of horizontal (in-market) bank mergers. *Journal of Banking and Finance,* 17, 411-422.

Rhoades, S.A., (1998), The efficiency effects of bank mergers: An overview of case studies of nine mergers, *Journal of Banking & Finance*, 22, pp. 273-291.

Vander Vennet, R. (1996). The effect of mergers and acquisitions on the efficiency and profitability of EC credit Institutions. *Journal of Banking and Finance*, 20, pp. 1531-1558.

Vander Vennet, R. (2002). Cost and profit efficiency of financial conglomerates and universal banks in Europe, *Journal of Money, Credit, and Banking*, 34(1), 254-282.